

Non-tumour morbidity and mortality after modified radical mastectomy

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From 1985 to 1987 148 patients underwent mastectomy for breast cancer, of whom 91 underwent modified radical mastectomy. Of these patients (median age 60 years (range 31–86 years)), 89 have been assessed for early (< 30 days) and late (> 30 days) non-tumour morbidity and mortality. A total of 41 patients had nodal metastases. Adjunctive therapy used was tamoxifen in 70 patients and radiotherapy in 20. Overall, 47 patients (53%) developed a total of 75 complications, and there was one 30-day mortality. Of the patients, 26 developed one complication, 14 had two complications and 7 three complications. Early complications were lymphocele/seroma ($n=22$), wound infection ($n=9$) and cardiopulmonary problems (five deep vein thrombosis, two pulmonary embolus (1 death), one myocardial infarct). Late complications were lymphoedema ($n=10$), pectoralis major wasting ($n=6$), frozen shoulder ($n=7$), intercostobrachial neuralgia ($n=4$), and a small number of self-limiting wound problems ($n=9$). There were two late deaths (myocardial infarcts). Early complications were not related to nodal status, and late complications were related to neither nodal status nor radiotherapy. Significant morbidity is attached to radical surgery for breast cancer. Most complications are minor and self-limiting, but there are a small number of late complications which may affect quality of life.

At present there are two major surgical treatments for patients presenting with operable breast cancer, ie mastectomy or wide local excision plus radiotherapy (WLE + RT). Studies comparing these options in terms of effectiveness for local control and survival have failed to reveal any major differences (1,2). There are few published reports on non-tumour morbidity and mortality after mastectomy. This study has therefore set out to analyse

non-tumour morbidity and mortality in patients undergoing modified radical mastectomy for cancer in a single surgeon's practice (EAB).

Patients and methods

Between January 1985 and December 1987, 148 patients (mean age 60 years, range 31–86 years) under the care of a single surgeon (EAB), underwent mastectomy for breast cancer. Of these 148, 108 patients with 'operable' breast cancer underwent modified radical mastectomy, this being the preferred treatment option of the surgeon. Modified radical mastectomy was performed by a single surgeon in all instances. Using a transverse skin incision, thick skin flaps were mobilised to facilitate mastectomy and axillary clearance was performed preserving only the axillary vein, the subscapular vascular pedicle, the nerves to latissimus dorsi and serratus anterior, and the lateral pectoral nerve (whenever possible). After completion of the mastectomy the skin flaps were closed in one layer over two suction drains (one placed in the axilla and one under the chest wall skin flaps).

Postoperatively, the drains were left *in situ* until either the daily drainage from each was less than 20 ml or until 7 days had elapsed when they were removed irrespective of the drainage volumes. Wounds were cleaned and dressed daily by trained nursing staff and active shoulder and arm exercises were started at 48 h after operation.

A total of 89 patients have been assessed by a second surgeon (KRW) by a combination of personal interview and review of the notes for early (< 30 days) and late (> 30 days) non-tumour-related morbidity and mortality. Of the other 19 patients, two have been lost to local follow-up having moved from the area, and the remaining 17 were excluded from analysis as they had been involved in a separate study.

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Table I. Early and late complications after modified radical mastectomy with respect to nodal status and treatment with RT

	Early			Late					
	All	Node +ve	Node -ve	All	Node +ve	Node -ve	RT	No RT	
Seromas	22 (25%)	12	10	Lymphoedema	10 (11%)	6	4	2	8
Wound infection	9 (10%)	4	5	P. major wasting	6 (7%)	2	4	0	6
Deep vein thrombosis	5 (6%)	3	2	Frozen shoulder	7 (8%)	3	4	1	6
Pulmonary embolus	2 (2%)	1*	1	Neuralgia	4 (5%)	1	3	1	3
Myocardial infarction	1 (1%)	1	0	Wound induration	5 (6%)	2	3		
				Scar hypertrophy	2 (2%)	1	1		
				Sinus formation	2 (2%)	1	1		

Values are numbers of patients with percentage incidence in parentheses

* Patient died

Statistical analysis used was the Hypothesis of Proportions test

Early complications Node +ve vs Node -ve $z = 1.3$; $P = 0.096$

Late complications Node +ve vs Node -ve $z = 0.25$; $P = 0.40$

Late complications RT vs No RT $z = -1.14$; $P = 0.13$

A total of 41 patients were node positive. Adjuvant treatment used was tamoxifen in 70 post- and perimenopausal patients, and radiotherapy (RT) in 20 patients. Radiotherapy was administered to supraclavicular nodes in patients with heavy (>30%) axillary node involvement and to the internal mammary chain in those patients with medially placed breast tumours. The length of follow-up ranged from 1 to 3 years.

Statistical analysis used was the hypothesis of proportions test (Microstat by Ecosoft Inc.).

Results (Table I)

Forty-two patients developed no complications. There were 75 complications recorded in the remaining 47 patients.

Early complications

A total of 31 local wound complications were seen (22 lymphocoele/seromas and nine wound infections). Lymphocoele/seromas were treated by repeated aspiration, initially on an alternate day basis then with decreasing frequency as the aspirated volumes decreased. In all cases no aspirations were required beyond 24 days postoperatively, and the number of aspirations required ranged from 2 to 7. Lymphocoele/seroma formation did not appear to be related to drainage volumes, since in a number of instances collections developed even when wound drainage was minimal. Antibiotic therapy resulted in complete resolution in eight of the wound infections. None of these infections was due to the presence of lymphocoele/seroma formation. In one case an abscess developed which required surgical drainage, and this case may have resulted from the development of a wound collection. Non-wound complications occurred in six patients, five patients with deep venous thrombosis

of whom two had pulmonary emboli, and one of these patients died. The other patient had a non-fatal myocardial infarct.

Nodal status did not appear to influence the development of local complications, and no long-term sequelae resulted from these early complications.

Late complications

Minor wound problems persisted after 30 days in a small number of patients. These were prolonged wound induration in five, lasting for up to 12 weeks, and sinus formation in two, both of which resolved within 6 weeks. Keloid scars developed in two other patients. None of these complications resulted in any long-term morbidity.

Other complications developed after 30 days. Ten patients developed lymphoedema. This was mild in eight cases requiring only a compression support gauntlet, but two other patients had moderate to severe lymphoedema requiring 'flowtron' compression therapy. In six patients wasting of the lateral part of pectoralis major was noted resulting in some cosmetic deformity to the anterior axillary fold. Four patients developed persistent neuralgia affecting the axilla and the lateral chest wall, which in all cases had persisted in excess of 12 months. All of these patients required regular analgesia for relief of symptoms. In seven instances patients presented with signs and symptoms of 'frozen shoulder' on the side of the mastectomy. The median time of presentation after mastectomy was 13 months (range 1-20 months). All patients were treated by analgesia and physiotherapy and all recovered fully within 3 months.

There were two non-malignant late deaths, both due to myocardial infarction at 8 months and 36 months.

Adjuvant RT was administered to 20 patients in this series, and in all instances was started after all local wound problems had resolved. Therefore, late complications were assessed with regard to treatment or no

treatment with RT. Only four complications were seen in the 20 patients who received RT compared with 23 complications seen in 69 patients not so treated. Furthermore, examination of nodal status and treatment with RT revealed four complications in 20 node positive patients who received RT and eight complications in 21 node positive patients not similarly treated.

Overall (ie early and late), 53% of patients developed complications. Most of these were minor and self-limiting, although others resulted in permanent disability, though these were small in number. Twenty-six patients developed one complication (13 lymphocoele/seromas), 14 had two complications, and seven had three complications.

Statistical analysis of these complications failed to reveal any differences between node positive or node negative patients or between those patients treated with RT and those not similarly treated.

Discussion

The management of primary breast cancer remains controversial. Trials have shown no survival advantage in patients treated by mastectomy compared with those treated by WLE + RT (1). Many surgeons now favour an initial conservative approach for breast cancer treatment.

Surprisingly little attention has been focused on complications resulting from surgical treatment, although these are well-recognised both for mastectomy and WLE + RT (3,4).

This study has assessed complications in the early postoperative period and the late sequelae after modified radical mastectomy (MRM) in a single surgeon's practice.

The early postoperative complications of infection (10%) (4) and lymphocoele/seroma (25%) (5) are similar to those reported in other studies and, with the exception of one patient who required incision and drainage of an abscess, were treated conservatively. Cardiopulmonary complications resulted in the single postoperative death due to a pulmonary embolus following a deep venous thrombosis (DVT). The incidence of DVT (5.6%) was higher than expected, despite the use of anti-embolism stockings.

As noted by others (4), late complications consisting of lymphoedema, pectoralis major wasting, 'frozen shoulder', and lateral chest wall neuralgia formed the bulk of the long-term sequelae. Some minor wound problems also occurred, and apart from two patients with scar hypertrophy these were self-limiting.

Wasting of the lateral edge of the pectoralis major muscle caused a cosmetic deformity to the anterior axillary fold. This has been reported as a relatively common problem after mastectomy (6). In this series only 6 (6.7%) patients developed this complication. This low incidence may result from the fact that care is taken to preserve both the lateral and medial pectoral nerves, thus preserving motor function and tone to pectoralis major.

Persistent neuralgia, defined as pain lasting in excess of 12 months after surgery and requiring regular analgesia, affecting the lateral chest wall was observed in 4 (4.5%) patients, and was thought to be due to neuroma formation of the transected intercostobrachial nerve. Paraesthesia and anaesthesia affecting the lateral chest wall and medial aspect of the upper arm were also noted but did not cause significant problems. This occurred in almost all patients and had resolved by 1 year. Furthermore, all patients were told to expect this after surgery and it was not therefore considered to be an unexpected postoperative complication. However, it has been suggested that these problems may be avoided by careful preservation of the intercostobrachial nerve during axillary dissection (7).

Analysis of these results failed to demonstrate any statistical differences in complications between node positive and node negative patients, nor between those receiving radiotherapy and those not so treated.

During the period of follow-up only two patients developed locoregional recurrence, neither of whom had received RT. Extensive axillary dissection, undertaken to minimise the small risk of locoregional recurrence, may result in an unacceptably high complication rate to the majority of patients who may not in fact be at risk. Careful follow-up of patients would enable early detection and treatment (either by axillary dissection or RT) of those patients unfortunate enough to develop locoregional recurrence.

Since many patients coming to mastectomy at present have negative axillary nodes, it is desirable to obtain adequate details of axillary node status without incurring the sequelae of radical axillary dissection. Preoperative colour Doppler imaging and peroperative contact cytology of axillary nodes are two methods currently being evaluated. If use of either or both enables axillary node status to be assessed accurately then it is to be welcomed as it can be expected to reduce the morbidity of the axillary operation.

In summary, we have utilised a well-recognised surgical procedure (MRM) for the management of breast cancer and have shown, like others, that a significant number of early and late complications may result (4,5). Overall, 53% of patients undergoing MRM developed complications, and although most were minor and self-limiting there remained a small number of untreatable, persistent late complications, ie lymphoedema, intercostobrachial neuralgia, and pectoralis major wasting which may have an appreciable impact on quality of life.

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Invited comment

This paper is in the best tradition of surgical audit for the outcome of a series of operations are carefully assessed and described. The disadvantages are laid out for us to see. The authors have reservations about the operation and these relate to the problems arising from the axillary clearance.

I find this a timely paper for my recent tendency has been towards more axillary clearance in two groups of patients (even if combined with a wide excision of a tumour rather than a mastectomy). For the under 50s an axillary clearance may be necessary to obtain the best selection of those with positive nodes who need chemo-

therapy. For the over 50s an axillary clearance may be necessary to avoid radiotherapy in those with positive nodes. However, my enthusiasm must be tempered by the results of this article until we can reliably determine which patients really need the operation for their involved nodes. Will intraoperative cytology of sampled nodes provide the answer?

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